

QUAD CYCLE AND EXERCISE MACHINE

Field of the Invention

This invention relates cycle transportation and exercise equipment and more particularly to a four wheeled arm and foot powered cycle and exercise apparatus.

Background of the Invention

Bicycle and other cycle devices are known in the arts including U.S. Patents as follows: 6,485,041 to Janssen; 6,378,882 to Devine; 6,032,970 to Porter; and 6,190,289 to Pyles et al. The patents referred to herein are provided herewith in an Information Disclosure Statement in accordance with 37 CFR 1.97.

Summary of the Invention

The quad cycle and exercise machine comprises four wheeled cycle apparatus providing foot pads interrelated to hand operated levers for the operation of a bicycle cam and derailleur gear system for propulsion of the quad cycle. The operator is upstanding during operation. Standard bicycle brakes and derailleur systems are employed.

Brief Description of the Drawings

The foregoing and other features and advantages of the present invention will become more readily appreciated as the same become better understood by reference to the following detailed description of the preferred embodiment of the invention when taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a perspective view of the quad cycle (1) showing the main frame (100) with frame center leg (140) and front "T" frame (160) and rear "T" frame (180). Seen is the standard bicycle derailleur system (700) and standard bicycle brake assembly (600). The frame center vertical leg (260) is depicted relative to the swing arm assembly

(400) which is integral with the means of propulsion and steering; also depicted are the front wheels (175) interrelated with the steering system (800).

Fig. 2 is a detail of the swing arm assembly (400) as section 2 from Fig. 1.

Fig. 3 is a plan detail and section 3 from Fig. 1 of the front wheels (175) and steering related features.

Fig. 4 is a front elevation of the front wheel (175) assembly.

Fig. 5 is detail from Fig. 2 of the left upper swing arm section (415) and left master hub (470).

Fig. 6 is a side elevation of the left master hub (470).

Fig. 7 is a detail from Fig. 2 of the right upper swing arm section (435) and right master hub (480).

Fig. 8 is a side elevation of the right master hub (470).

Fig. 9 is a detail from Fig. 3 showing the left steering hub (850). Those of ordinary skill will recognize that the elements of the right steering hub (810) are represented in mirror image from that shown in the left steering hub (850).

Fig. 10 is a perspective showing an alternative embodiment of the quad cycle (1) rear axle (192) bearing means (193) and wheels (195)

Detailed Description

Figures 1 through 9 depicts the quad cycle (1) and systems composing the quad cycle (1). The quad cycle (1) has a frame means comprising a main frame (100) having at least one elongated center leg (140) having a center leg first end (144) and a

1 center leg second end (148). A front “T” frame (160), generally tubular and
2 elongated, has a front “T” frame first end (164), a front “T” frame second end (168)
3 and is affixed by frame affixing means at the center leg first end (144); the front “T”
4 frame (160) is comprised of a frame member generally orthogonal to the at least one
5 center leg (140). In the preferred embodiment, the front “T” frame (160) has a front
6 “T” frame top (170) and the elongated center leg (140) has a center leg bottom (146);
7 the front “T” frame (160) is affixed at the front “T” frame top (170) proximal the
8 center leg first end (144) at the center leg bottom (146).

9 A rear “T” frame (180), generally elongated and affixed by frame affixing
10 means at the center leg second end (148); the rear “T” frame (180) is composed of a
11 frame member generally orthogonal to the at least one center leg first end (144). The
12 rear “T” frame (180) has a rear “T” frame right end (184) and a rear “T” frame left
13 end (188). The frame members including those of the main frame (100), in the
14 preferred embodiment, are constructed of a rigid tubular means comprised of metals,
15 composite materials, plastics and other materials commonly recognized by those of
16 ordinary skills in the bicycle arts for frame construction. In the preferred embodiment
17 the main frame, and other frame members, are formed from light weight rectangular
18 metal tubing.

19 Bearing, axle and wheel means are mounted at the rear “T” frame right end
20 (184) and the rear “T” frame left end (188). Bearing, axle and wheel means are
21 generally so mounted by affixing, by frame affixing means, a bearing mount means at
22 the respective rear “T” frame right end (184) and rear “T” frame left end (188). In the
23 preferred embodiment the rear “T” frame (180) has a right bearing mount (185)
24 affixed by frame affixing means at the rear “T” frame right end (184) positioned
25 generally orthogonal to the rear “T” frame (180) and parallel with the frame center
26 leg (140). The rear “T” frame (180) has a left bearing mount (190) affixed by frame
27 affixing means at the rear “T” frame left end (188) positioned generally orthogonal to
28 the rear “T” frame (180) and parallel with the frame center leg (140). Bearing,
29 bushing and axle means (192) are received by apertures and bearing, bushing and
30 axle receiving means (186) to position the bearings, bushings and axle (192)
orthogonal to the frame center leg (140). At least one rear wheel (195) is mounted at

1 said axle (192) and, in the preferred embodiment there are at least two rear wheels
2 (195) mounted at said axle (192), one at the right bearing mount (185) and one at the
3 left bearing mount (190).

4 A standard bicycle brake system (600) is provided for stopping having brake
5 means (640), including disk brakes; hand grip or lever (610) and brake cable (620)
6 means to communicate braking commands to a caliper means (630) to urge braking
7 forces on the brake means (640).

8 A standard bicycle derailleur (700) assembly is mounted by derailleur mounting
9 means (711) at the frame center leg (140) and at the axle (192); a front derailleur gear
10 assembly (710) with drive cam (730) is mounted by gear mounting means at the
11 frame center leg (140) intermediate the center leg first end (144) and the center leg
12 second end (148); a front derailleur (712) is mounted at a derailleur mounting means
13 (711) comprising a bracket support structure capable of receiving a derailleur and
14 which is provided in the disclosed invention by an upstanding tube immovably
15 affixed to the frame center leg (140) intermediate the center leg first end (144) and
16 the center leg second end (148). Other equivalent mounting means will be
17 appreciated by those of ordinary skill in the bicycle gear mounting arts. A rear
18 derailleur gear assembly (720) is mounted by gear mounting means at the rear axle
19 (192) intermediate the right bearing mount (185) and the left bearing mount (190);
20 rear derailleur (722) and rear derailleur mounting means (721) is mounted at the rear "T"
21 frame (180). Derailleur hand grip or shift levers (750) are in front derailleur cable (760)
22 and rear derailleur cable (762) communication with the respective front derailleur (712)
23 and the rear derailleur (722). It will be appreciated that cable means including front
24 derailleur cable (760) and rear derailleur cable (762), and indeed other cable means
25 disclosed herein, will be routed from controls or source via frame means members to
26 point of action. A chain drive means (740), provided by endless chain or belt drives
27 or other equivalent gear interconnection means, drive and gear shift interrelates the
28 front derailleur gear assembly (710) with the rear derailleur gear assembly (722). The
29 brake assembly means (600) and front derailleur (712), rear derailleur (722), gear and
30 derailleur assemblies are affixed by brake assembly and derailleur gear and derailleur
affixing means including bushings, bearings, and other affixing means including

1 races, bolts, screws, washers, rivets, drive cams, seals and other such affixing means
2 as will be appreciated by those of ordinary skill in the bicycle arts.

3 Steering and propulsion means, driven by arm and foot power, is seen in
4 association with a center vertical frame means (260) seen as the center vertical leg
5 (260), swing arms (400) and foot pads (500). Again, frame means is generally
6 formed from tubular materials including a variety of cross sections and, in the
7 preferred embodiment, a rectangular or square cross section tube of metal or
8 composite materials. The center vertical leg (260) is upstanding and has an upper
9 vertical leg section (280) and a lower vertical leg section (290). The upper vertical
10 leg section (280) has a vertical leg first end (282) and a vertical leg second end (287)
11 with a vertical leg angle (284) intermediate the said vertical leg first end (282) and
12 the vertical leg second end (287). The lower vertical leg section (290) has a lower leg
13 first end (291) and a lower leg second end (292). The lower vertical leg section (290)
14 at the lower vertical section second end (292) is sized to either receive the upper
15 vertical leg section at the vertical leg first end (282) or the vertical leg first end (282)
16 is sized to receive the lower vertical leg section (290) at the lower leg second end
17 (292). Movable or immovable frame affixing means proximal the lower leg second
18 end (292) and the vertical leg first end (282); movable frame affixing means generally
19 aperture means (265) in the upper vertical leg section (280) proximal the vertical leg
20 first end (282) in alignment with aperture means (265) in the lower vertical leg section
21 (290) proximal the lower leg second end (292) where said aligned aperture means
22 (265) receive bolt/nut means (267); immovable frame affixing means includes
23 welding. Those of ordinary skills in the frame arts will appreciate equivalent
24 movable frame affixing means to the use of bolt/nut means (267)..
25 Vertical leg bracket means (293) affixed by immovable means at the lower leg first
26 end (291) and oriented to receive the frame center leg (140) intermediate the center
27 leg first end (144) and the derailleur mounting means (711).

28 Said vertical leg bracket means (293) is, in the preferred embodiment tubular
29 or inverse “U” shaped and sized to receive the frame center leg (140); the center
30 vertical leg (260) is moveably or immovably affixed at the frame center leg (140)
with movable means generally aperture means in the frame center leg (140) aligned

1 with aperture means in the frame aperture means (150) aligned with aperture means
2 in the leg bracket means (293) and moveably affixed by bolt/nut means (295). The
3 interconnection between the center leg (140) and the said leg bracket means (293)
4 allows the center vertical leg (260) to be moved relative to the frame center leg (140)
5 to accommodate various sized riders. The upper section of the vertical leg (280) is
6 angled, at the vertical leg angle (284), towards the rider as a means of increasing rider
7 leg clearance.

8 A swing arm assembly (400) provides lever means to assist with arm
9 propulsion and steering and is comprised of an upstanding left swing arm (410) and
10 right swing arm (430). Said left swing arm (410) is composed an left upper section
11 (415), a left middle section (420) and a left lower section (425); said right swing arm
12 (430) is composed an right upper section (435), a right middle section (440) and a
13 right lower section (445).

14 An elongated rigid swing arm mount (450), generally comprised of cylindrical
15 metal or composite tube or rod means interrelates the left swing arm (410), the center
16 vertical leg (260) and the right swing arm (430). Vertical leg swing arm apertures
17 (285), intermediate the vertical leg angle (284) and the vertical leg second end (287),
18 are in alignment with left middle swing arm apertures (417) and right middle swing
19 arm apertures (437); said apertures are sized to receive and do receive the swing arm
20 mount (450). The swing arm mount (450) has a left end (455) and a right end (460)
21 and is orthogonal to the frame center leg (140). The left middle swing arm section
22 (420) is received at the swing arm mount (450) left end (455) and is rotatably affixed,
23 by rotatable means, proximal the left end (455); the right middle swing arm section
24 (440) is received at the swing arm mount (450) right end (440) and is rotatably
25 affixed, by rotatable means, proximal the right end (460). Rotatable means
26 comprising bearing and or bushing means at said left middle swing arm apertures
27 (417) and right middle swing arm apertures (437) where said bearing and or bushing
28 means in turn rotatably receives the said swing arm mount (450). Said left middle
29 swing arm section (420) and right middle swing arm section (440) are positionally
30 fixed by pin, set screw, or other equivalent position fixing means.

The swing arm assembly (400) is upstanding relative to the frame center leg

1 (140).

2 The tubular left swing arm (410) is comprised of a left middle swing arm
3 section (420) intermediate a left lower swing arm section (425) and a left upper swing
4 arm section (415). Fig. 1 and 2 show the upper swing arm section (415). The left
5 upper swing arm section (415) has a left upper swing arm upper end (416) and a left
6 upper swing arm lower end (418). The left middle swing arm section (420) has a left
7 middle swing arm upper end (421), a left middle swing arm lower end (423), at least
8 one left middle swing arm adjustment aperture (422) intermediate the left middle
9 swing arm upper end (421) and the left middle swing arm lower end (423) and at
10 least one left middle swing arm aperture (424). The left lower swing arm section
11 (425) has a left lower swing arm upper end (426), a left lower swing arm lower end
12 (428), at least one left lower swing arm adjustment aperture (427) intermediate the
13 left lower swing arm upper end (426) and the left lower swing arm lower end (428)
14 and at least one left lower swing arm aperture (429) proximal the left lower swing
15 arm lower end (428).. The left swing arm (410) and the right swing arm (430) are
16 composed primarily of tubular construction including but not limited to metal tubing.

17 The tubular left middle swing arm lower end (423) receiving or being
18 received by the tubular left lower swing arm upper end (426) such that the at least one
19 left middle swing arm adjustment aperture (422) and the at least one left lower swing
20 arm adjustment aperture (427) are aligned to receive affixing means comprised
21 generally of bolt and nut means or the equivalent. Those of ordinary skills in the
22 interconnection of tubular arts will appreciate that there will be at least two left
23 middle swing arm adjustment apertures (422) and at least two left lower swing arm
24 adjustment apertures (427) which will be in alignment to receive affixing means for
25 the purpose of adjusting the length of the entirety of the left middle swing arm section
26 (420) and the left lower swing arm section (425) from the from the left middle swing
27 arm upper end (441) to the left lower swing arm lower end (448).

28 The tubular right swing arm (430) is comprised of a right middle swing arm
29 section (440) intermediate a right lower swing arm section (445) and a right upper
30 swing arm section (435). The right upper swing arm section (435) has a right upper
swing arm upper end (436) and a right upper swing arm lower end (438). The right

1 middle swing arm section (440) has a right middle swing arm upper end (441), a right
2 middle swing arm lower end (443), at least one right middle swing arm adjustment
3 aperture (442) intermediate the right middle swing arm upper end (441) and the right
4 middle swing arm lower end (443) and at least one right middle swing arm aperture
5 (444). The right lower swing arm section (445) has a right lower swing arm upper
6 end (446), a right lower swing arm lower end (448), at least one right lower swing
7 arm adjustment aperture (447) intermediate the right lower swing arm upper end
8 (446) and the right lower swing arm lower end (448) and at least one right lower
9 swing arm aperture (449) proximal the right lower swing arm lower end (448).. The
10 right swing arm (410) and the right swing arm (430) are composed primarily of
11 tubular construction including but not limited to metal tubing.

12 The tubular right middle swing arm lower end (443) receiving or being
13 received by the tubular right lower swing arm upper end (446) such that the at least
14 one right middle swing arm adjustment aperture (442) and the at least one right lower
15 swing arm adjustment aperture (447) are aligned to receive affixing means comprised
16 generally of bolt and nut means or the equivalent. Those of ordinary skills in the
17 interconnection of tubular arts will appreciate that there will be at least two right
18 middle swing arm adjustment apertures (442) and at least two right lower swing arm
19 adjustment apertures (447) which will be in alignment to receive tubular affixing
20 means for the purpose of adjusting the length of the entirety of the right middle swing
21 arm section (440) and the right lower swing arm section (445) from the from the right
22 middle swing arm upper end (441) to the right lower swing arm lower end (448).
23 Tubular affixing means includes bolt with nut, rivet and other equivalent means.

24 A left master hub (470) immovably affixed by hub affixing means at the left
25 upper swing arm lower end (418). Hub affixing means comprising generally
26 welding, threaded means between the left master hub (470) and the left upper swing
27 arm lower end (418), bolt/nut means, screw and other means as will be appreciated by
28 those of ordinary skills in the mechanical arts. Left master hub bracket means (471)
29 are immovably affixed by bracket affixing means at the left middle swing arm upper
30 end (421). The left master hub (470) is received by the left master hub bracket means
(471) and is pivotally affixed relative to the left master hub bracket means (471). The

1 left master hub (470) has at least one left master hub bracket aperture (472) which
2 aligns with at least one left master hub aperture (475). The at least one left master
3 hub bracket aperture (472) and the at least one left master hub aperture (475) receive
4 left master hubs bushing or bearing means (473) wherein said bushing or bearing
5 means (473) comprises bearing surfaces, including bushings and or bearings, for the
6 left master hub aperture (475). Said left master hub bushing or bearing means (473)
7 receives a rotatable affixing means (474) between the said left master hub (470) and
8 the left master hub bracket means (471) wherein, in the preferred embodiment, said
9 rotatable affixing means includes a bolt and nut received by the left master hub
10 bushing or bearing means (473). The left master hub (470) is generally disk shaped
11 having a left master hub groove (476) at a left master hub perimeter (478) where the
12 left master hub groove (476) is principally "V" or "U" shaped to receive cable means
13 for steering control (1000) comprising a first left side steering cable (1100) and a first
14 right side steering cable (1200). The said first left side steering cable (1100) fixedly
15 terminated at the left master hub (470) at the left master hub groove (476) by a
16 nonadjustable cable fixing means (477) which anchors the indicated cable by screw,
17 bolt, welding or other immovable fixing means. The said first right side steering
18 cable (1200) fixedly terminated at the left master hub (470) at the left master hub
19 groove (476) by a nonadjustable cable fixing means (477) which nonadjustable cable
20 fixing means or anchors comprising screw, bolt, welding or other immovable fixing
21 means. A right master hub (480) immovably affixed by hub affixing means at the
22 right upper swing arm lower end (438). Hub affixing means comprising generally
23 welding, threaded means between the right master hub (480) and the right upper
24 swing arm lower end (438), bolt/nut means, screw and other means as will be
25 appreciated by those of ordinary skills in the mechanical arts. Right master hub
26 bracket means (481) are immovably affixed by bracket affixing means at the right
27 middle swing arm upper end (441). The right master hub (480) is received by the
28 right master hub bracket means (481). The right master hub (480) has at least one
29 right master hub bracket aperture (482) which aligns with at least one right master
30 hub aperture (485). The at least one right master hub bracket aperture (482) and the
at least one right master hub bracket aperture (482) receive right master hubs bushing

1 or bearing means (483) wherein said bushing or bearing means (483) comprises
2 bearing surfaces, including bushings and or bearings, for the said right master hub
3 aperture (485). Said right master hub bushing or bearing means (483) receives a
4 rotatable affixing means (484) between the said right master hub (480) and the right
5 master hub bracket means (481) wherein, in the preferred embodiment, said rotatable
6 affixing means includes a bolt and nut received by the right master hub bushing or
7 bearing means (483). The right master hub (480) is generally disk shaped having a
8 right master hub groove (486) at a right master hub perimeter (488) where the right
9 master hub groove (486) is principally “V” or “U” shaped to receive a second right
10 side steering cable (1300) and a second left side steering cable (1400). The said
11 second right side steering cable (1300) fixedly terminated at the right master hub
12 (480) at the right master hub groove (486) by a nonadjustable cable fixing means
13 (487) which anchors the indicated cable by screw, bolt, welding or other immovable
14 fixing means. The said second left side steering cable (1400) fixedly terminated at
15 the right master hub (480) at the right master hub groove (486) by a nonadjustable
16 cable fixing means (487) which anchors the indicated cable by screw, bolt, welding
17 or other immovable fixing means.

18 Hand grip or lever means (610) for brake assembly (600) operation positioned
19 proximal the left upper swing arm upper end (416) or proximal the right upper swing
20 arm upper end (436). Derailer hand grip or shift levers (750) for derailer gear
21 operation positioned proximal the left upper swing arm upper end (416) or proximal
22 the right upper swing arm upper end (436).

23 The tubular left swing arm (410) and the tubular right swing arm (430) rotate
24 about the swing arm mount (450). The left swing arm (410) and the right swing arm
25 (430) cycle toward the front “T” frame (160), then away from the front “T” frame
26 (160) toward the rear “T” frame (180) and back for the complete cycle. The cycle of
27 the left swing arm (410) and the cycle of the right swing arm (430) each ascribes a
28 vertical upstanding plane parallel to the frame center leg (140) and the center vertical
29 leg (260). The left upper swing arm section (415) and the right upper swing arm
30 section (435) rotate respectively relative to the left middle swing arm section (420)
and the right middle swing arm section (440), about the respective left master hub

1 aperture (475) and the right master hub aperture (485), ascribing a rotation plane
2 orthogonal to the swing plane ascribed by the left swing arm (410) and the right
3 swing arm (430). When turning forces are exerted at the left upper swing arm section
4 (415) and the right upper swing arm section (435), it is noted that the said left upper
5 swing arm section (415) and the right upper swing arm section (435) are never
6 pivoting forward or backward, relative to the frame center leg (140) but remain,
7 relative to the frame center leg (140), in a plane parallel to that of the frame center leg
8 (140) and the center vertical leg (260).

9 Figures 1, 2, 3, 4 and 9 show the left upper swing arm section (415), right
10 upper swing arm section (435), left master hub (470), right master hub (480), right
11 steering hub (810) and left steering hub (850). The left upper swing arm section
12 (415) and the right upper swing arm section (435), when rotated, exert forces on the
13 left side steering cable (1100) and the right side steering cable (1200) which are in
14 steering communication with a steering unit (800). The steering unit (800), proximal
15 to or at the center leg first end (144), comprises a right axle (835) affixed by axle
16 affixing means at the front "T" frame first end (164) at a right steering knuckle (830)
17 and a left axle (875) affixed by axle affixing means at the front "T" frame second end
18 (168) at a left steering knuckle (870). At least one front wheel (175) rotatably affixed
19 by wheel affixing means at each of the said right axle (835) and left axle (875)
20 respectfully distal to the front "T" frame first end (164) and the front "T" frame
21 second end (168). The right steering knuckle (830) comprises a right steering hub
22 (810) immovably affixed by fixing means to a right bearing mount (185); a bushing
23 or bearing means and housing with shaft (186) received by the rotatable right bearing
24 mount (185); the right axle (835) extending from and affixed by axle affixing means
25 to the right bearing mount (185). The left steering knuckle (870) comprises a left
26 steering hub (850) immovably affixed by fixing means to a left bearing mount (190);
27 a bushing or bearing means and housing with shaft (168) received by the rotatable left
28 bearing mount (190); the left axle (875) extending from and affixed by axle affixing
29 means to the left bearing mount (190). A tie bar (890) interrelates the right steering
30 hub (810) and the left steering hub (850) to insure alignment and coordinated parallel
movement between the at least one front wheel (175) at each of the said right axle

1 (835) and left axle (875). A left tie bar connection (892) and a right tie bar
2 connection (894) affixed by immovable means respectively at the left bearing mount
3 (190) and the right bearing mount (185) receive the tie bar (890) by rotatable
4 connection means (893).

5 The steering communication means between the left upper swing arm section
6 (415) and left master hub (470) is respectively by the first left side steering cable
7 (1100) and second right side steering cable (1200) connection with the left steering
8 hub (850) and the right steering hub (810) respectively; and between the right upper
9 swing arm section (435) and right master hub (480) is respectively by second left side
10 steering cable (1300) and second right side steering cable (1400) connection with the
11 right steering hub (810) and the left steering hub (850) respectively. Thus the left
12 upper swing arm section (415), when pivoted at the left master hub (470) exerts
13 rotational forces at both the right steering hub (810) and the left steering hub (850)
14 and the right upper swing arm section (435), when pivoted at the right master hub
15 (480) exerts rotational forces at both the right steering hub (810) and the left steering
16 hub (850).

17 In the preferred embodiment the right steering hub (810) is primarily disk
18 shaped having a right steering hub groove (820) receiving second left side steering
19 cable (1300) and second right side steering cable (1400) and a the left steering hub
20 (850), primarily disk shaped and having a left steering hub groove (860) receives the
21 first left side steering cable (1100) and the first right side steering cable (1200).

22 The steering cable interconnections are as follows:

23 1.) From the left master hub (470) thread the first left side steering cable
24 (1100) through cable shield means to a right hub right side (812) position of the right
25 steering hub (810) at the right steering hub groove (820) to be secured by right
26 steering hub cable securing means (845);

27 2.) from the left master hub (470) thread the first right side steering cable
28 (1200) through cable shield means to a left hub left side (851) position of the left
29 steering hub (850) at the left steering hub groove (860) to be secured by right steering
30 hub cable securing means (885);

3.) from the right master hub (480) thread the second left side steering cable

1 (1400) through cable shield means to a left hub right side (852) position of the left
2 steering hub (850) at the left steering hub grove (860) to be secured by left steering
3 hub cable securing means (885);

4 4.) from the right master hub (480) thread the second right side steering cable
5 (1300) through cable shield means to a right hub left side (811) position of the right
6 steering hub (810) at the right steering hub grove (820) to be secured by right steering
7 hub cable securing means (845).

8 Cable guide means provided, in the preferred embodiment, by left side
9 steering cable guide (1150) and right side steering cable guide (1250) received
10 respectively by left middle swing arm aperture (424) and right middle swing arm
11 aperture (444). Left side steering cable guide (1150) and right side steering cable
12 guide (1250) have guide means to receive cable where such means includes aperture
13 means. Right steering hub cable guide (840) and left steering hub cable guide (880)
14 immovably affixed by means respectively at the right steering hub (810) and left
15 steering hub (850); said right steering hub cable guide (840) and left steering hub
16 cable guide (880) have guide means to receive cable where such means includes
17 aperture means. First left side cable (1100), first right side cable (1200), second left
18 side cable (1300) and second left side cable (1400) are received and guided by said
19 cable guide means; said cables, in the preferred embodiment, are comprised of
20 aircraft quality cable. The left master hub groove (476), right master hub groove
21 (486), the right steering hub groove (820) and the left steering hub groove (860) are
22 grooved to captivate said cable including air craft quality cable for steering control. It
23 is noted that there is no rotational cable movement at the left master hub groove
24 (476), right master hub groove (486), the right steering hub groove (820) and the left
25 steering hub groove (860) with cable movement only through cable shield means.
26 Cable shield means (841) is provided by plastic, metal and other tubing means.
27 Adjustable cable shield dead heads mounted on the main frame to take slack out of
28 steering and adjust position of the handle bars for rider comfort as desired.

29 The left master hub (470) and the right master hub (480), primarily disk
30 shaped and circular have a diameter either equal to or less than the diameter of the
primarily disk shaped and circular right steering hub (810) and left steering hub

1 (850).

2 The front "T" frame (160) is mounted under the frame center leg (140) to
3 maintain horizontal ground clearance and keep the right steering knuckle (830) and
4 left steering knuckle (870) vertical to the riding surface.

5 The left axle (875), when axle affixing means is a threaded means, will have a
6 left hand thread to prevent the rotation of the wheel from loosening the nut means
7 used to captivate bearings and seals.

8 There are adjustable cable shield means (495) mounted on the main frame
9 (100) primarily at the frame center leg (140) or the center vertical leg (260) allowing
10 cable adjustment to add or remove slack from steering, brake or derailleur cables as
11 adjustments are made for operator size and preferences.

12 The left upper swing arm section (415) and right upper swing arm section
13 (435) provide a handle bars function; said left upper swing arm section (415) and
14 right upper swing arm section (435) are rotatably adjustable in position as desired by
15 the operator.

16 The front wheel base (179), in the preferred embodiment, is wider from center to
17 center than the back wheel base (199) providing greater stability in operation. The
18 front wheels (175), in the preferred embodiment, are smaller in diameter than the rear
19 wheels (195) with larger rear wheels preferred for operational clearance between
20 riding surface and driving components. In the preferred embodiment, front wheels
21 (175) will have 16" tires and rear wheels will have 20" tires to provide ground
22 clearance and to allow derailleur operation.

23 Foot pads (500) comprise an elongated substantially planar left foot pad (510)
24 and right foot pad (540); the left foot pad (510) having a left foot pad first end (515),
25 a left foot pad second end (520) and a left foot pad center (525); the right foot pad
26 (540) having a right foot pad first end (545), a right foot pad second end (550) and a
27 right foot pad center (555). Bushing and shaft receiving means at the left lower
28 swing arm lower end (428) and at the right lower swing arm lower end (448) align
29 with and rotatably receive bushing and shaft receiving means at the left foot pad first
30 end (515) and right foot pad first end (545) respectively for a rotatable interaction.

Bushing and shaft receiving means includes aperture means at said left foot pad first

1 end (515) and right foot pad first end (545) and at the said left lower swing arm lower
2 end (428) and at the right lower swing arm lower end (448) including the left lower
3 swing arm aperture (429) and the right lower swing arm aperture (449). Bushing and
4 shaft receiving means at the left foot pad second end (520) and at the right foot pad
5 second end (550) align with and rotatably receive bicycle drive cam means at the
6 right and left respectively where the drive cam means, in the preferred embodiment,
7 is a standard bicycle drive cam (730). Arm lever action and foot action at the left 3g4
8 swing arm (410) and right swing arm (430) and at the left foot pad (510) and right
9 foot pad (540) exert forces against the drive cam (730) and derailleur gear assembly
10 (705) to propel the quad cycle (1).

11 Fig. 10 is a perspective showing an alternative embodiment of the quad cycle
12 (1) rear axle (192) bearing means (193) and wheels (195)
13

14 While a preferred embodiment of the present invention has been shown and
15 described, it will be apparent to those skilled in the art that many changes and
16 modifications may be made without departing from the invention in its broader
17 aspects. The appended claims are therefore intended to cover all such changes and
18 modifications as fall within the true spirit and scope of the invention.
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